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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,088	11/16/2001	Jack O. Chu	BUR92000077	8055

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12/03/2003

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EXAMINER

SONG, MATTHEW J

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/683,088	CHU ET AL.	
Examiner	Art Unit	
Matthew J Song	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 13-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, Claims 1-12 in the Paper filed on 10/2/2003 is acknowledged. The traversal is on the ground(s) that the election is made with traverse. This is not found persuasive because applicant has not provided any reasoning as to why an undue burden would not exist in Examiner the groups together; therefore.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 13-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the Paper filed on 10/2/2003.
3. This application contains claims 13-20 drawn to an invention nonelected with traverse in the Paper filed on 10/2/2003. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Akbar et al (US 5,259,918).

Akbar et al discloses a quartz reaction chamber **102** and a furnace **104** surrounds the reaction chamber. Akbar et al also discloses a first source **144** for supplying gas to the reaction chamber, a first pumping system comprising a turbomolecular pump **108** and a rotary pump **110** and a second source **148** for supplying a second gas to the reaction chamber. Akbar et al also discloses a second pumping system comprising a turbo molecular pump **118** and a rotary pump **120** and a third pumping system comprising a turbomolecular pump **160**, a roots blower **162**, and a rotary pump **164** (col 5, ln 10-67 and Fig 4). Akbar et al also discloses the pumps **118** and **120** can obtain a pressure of approximately 10-50 mTorr, the pumps **108** and **110** can obtain a pressure of approximately 10^{-7} Torr and the pumps **160**, **162** and **164** can obtain a pressure of about 200-300 mTorr (col 6, ln 10-40). Akbar et al also teaches a load lock chamber **106**.

Akbar does not disclose the intended use of the first, second and third pumping systems. However, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). The apparatus taught by Akbar et al structurally reads on the instantly claimed invention, therefore would be capable of performing the intended use.

Referring to claims 2-3 and 8, Akbar et al does not disclose the intended use of the first and second pumping systems. However, the apparatus taught by Akbar et al is capable of performing the claimed intended use of a LPVCD system because the pumps **118** and **120** can obtain a pressure of approximately 10-50 mTorr and an UHV-CVD system because the pumps **108** and **110** can obtain a pressure of approximately 10^{-7} Torr.

Referring to claim 4, Akbar et al discloses a load lock chamber **106** coupled to a turbo pump, this reads on applicant's turbomolecular pump, and a rotary pump, this reads on applicant's mechanical pump. A rotary pump is a well known in the art to be a mechanical pump, note Meyerson (US 5,298,452) below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) as applied to claims 1-4 and 8 above, and further in view of Zhou et al (US 5,879,467).

Akbar et al discloses all of the limitations of claim 5, as discussed previously. Akbar et al does not teach the third pumping system comprises a cryopump and a scroll pump arranged in series.

In a vacuum system for chemical vapor deposition (col 4, ln 25-40), Zhou et al teaches a vacuum chamber **14** is connected to a vacuum pump **18** and the vacuum pump is composed of a cryopump **20** and a rough pump **22** (col 5, ln 1-67 and Fig 3). Zhou et al also teaches the rough pump **22** may be a scroll pump or a dry pump (col 7, ln 45-55). Zhou et al also teaches the chamber **14** can be pumped down to 3×10^{-6} Torr (col 5, ln 30-31).

The vacuum pump taught by Zhou obtains equivalent pressures as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akbar et al with Zhou et al's vacuum pump composed of a cryopump and a scroll pump because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06)

5. Claims 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) as applied to claims 1-4 and 8 above, and further in view of Chu et al (US 6,013,134).

Akbar et al discloses all of the limitations of claim 6, as discussed previously. Akbar et al does not teach the first pumping system is coupled to a roots blower and a mechanical pump in series and the second pumping system is coupled to a turbomolecular pump, a roots blower, and a mechanical pump in series.

In an apparatus for chemical vapor deposition, note entire reference, Chu et al teaches an UHV-CVD system includes a turbomolecular pump **24**, a roots blower **25**, and a mechanical

pump **26** in series. Chu et al also teaches a UHV-LPCVD system **14** includes a gas inlet **32**, a furnace **33**, a turbomolecular pump **34** followed by a mechanical pump **36**, and a roots blower **35** followed by a mechanical pump **31**. Chu et al also teaches a transfer system **16** includes a turbomolecular pump **40** followed by a mechanical pump **41**, and a cryogenic pump **42** followed by a mechanical pump **43**.

The combination of vacuum pumps taught by Chu et al obtain equivalent pressures, Low pressure and UHV, as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akbar et al vacuum pumps with Chu et al's combination of vacuum pumps composed of a turbomolecular pump, a mechanical pump and roots blower in series and roots blower and mechanical pump in series because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06)

6. Claims 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) in view of Chu et al (US 6,013,134) as applied to claims 6, 9 and 10 above, and further in view of Zhou et al (US 5,879,467).

The combination of Akbar et al and Chu et al discloses all of the limitations of claim 7, as discussed previously. The combination of Akbar et al and Chu et al does not teach the third pumping system comprises a cryopump and a scroll pump arranged in series.

In a vacuum system for chemical vapor deposition (col 4, ln 25-40), Zhou et al teaches a vacuum chamber **14** is connected to a vacuum pump **18** and the vacuum pump is composed of a

cryopump **20** and a rough pump **22** (col 5, ln 1-67 and Fig 3). Zhou et al also teaches the rough pump **22** may be a scroll pump or a dry pump (col 7, ln 45-55). Zhou et al also teaches the chamber **14** can be pumped down to 3×10^{-6} Torr (col 5, ln 30-31).

The vacuum pump taught by Zhou obtains equivalent pressures as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify combination of Akbar et al and Chu et al with Zhou et al's vacuum pump composed of a cryopump and a scroll pump because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06).

Response to Arguments

7. Applicant's arguments filed 10/2/2003 have been fully considered but they are not persuasive.

Applicant's arguments against the Akbar reference are noted but are not found persuasive. Applicant alleges that the claimed invention results in a structural difference compared to Akbar because the first and second pumping systems of Akbar cannot affect the pressure of the reaction chamber during the processing of the substrates. The pumping systems **108, 110** and **118,120** are separated by a valve **114** from the reaction chamber **102**, as suggested by applicant. However, by opening the valve the pumping systems **can** evacuate the reaction chamber. The system taught by Akbar is intended to be used as a vacuum system for a load lock chamber, which is connected to a reaction chamber. However, the system is inherently capable

of the claimed intended use of evacuating the reaction chamber because the vacuum system is merely separated by a valve, which **can** be opened during operation. Furthermore, there is no structural difference between the claimed invention and the invention taught by Akbar et al because Akbar discloses a reaction chamber **102**, a first pumping system **108/110**, a second pumping system **118/120** and a third pumping system **160, 162, 164**.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the pumping systems are not isolated from the reaction chamber) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant's argument that Akbar is silent of first, second and third pumping systems for affecting the vacuum pressure of a reaction chamber during processing of a substrate is noted but is not found persuasive. Akbar discloses a first, second and third pumping system, which **can** affect the vacuum pressure of the reaction chamber by opening valves.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Meyerson (US 5,298,452) teaches a rotary pump and roots blower are high speed mechanical pumps known in the art (col 6, ln 55-60) and a valve is opened to pump down a furnace tube to vacuum (col 7, ln 1-15).

Venkatraman et al (US 6,083,313) teaches a high vacuum is achieved by roughing down a chamber with a mechanical pump followed by pumping with a roots blower pump and other pumping systems with or with traps can also be used (col 4, ln 60-67).

Barnett et al (US 5,783,295) teaches a chamber is evacuable to a high vacuum level of 1×10^{-6} Torr by using a turbomolecular pump backed by a roots blower and mechanical pump combination (col 5, ln 35-55).

Markunas et al (US 5,180,435) teaches an turbomolecular pump and roots blower together with a mechanical pump obtain pressures of 5×10^{-10} Torr when process gases are not flowing and 1-300 mTorr during epitaxial growth (col 6, ln 45-60).

Collins et al (US 5,210,466) teaches a system may comprise a turbomolecular pump backed by a mechanical pump and an optional roots blower and the turbomolecular pump may be omitted for many high pressure only systems (col 4, ln 45-65).

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 703-305-2667. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
Art Unit 1765

MJS


ROBERT KUNEMUND
PRIMARY EXAMINER